ALGEBRA 1 Name:_____

Notes for Point-Slope form

The Point-Slope form for the equation of a straight line is used to write the equation when:

1. The slope of the line and one point on the line is known, or,
2. Two points are known.

Usually a known point is not the *y*-intercept. If it were, then the slope-intercept form should be used to write the equation.

The Point-Slope form of a line: $y - y_1 = m(x - x_1)$

where *m* is the slope of the line and (x_1, y_1) is any point that the line passes through

Here are several examples of how to use this form for these situations:

1. How to write an equation **given the slope of a line and a point that the line contains**:

   Example: Write the equation of the line that has slope $-\frac{4}{3}$ and contains point $(-7, 5)$.

   Answer: $y - 5 = -\frac{4}{3}(x - (-7)) \quad \rightarrow \quad y - 5 = -\frac{4}{3}(x + 7)$

2. How to write an equation **given two points that lie on the line**:

   Example: Write the equation of the line that contains points $(-4, 6)$ and $(7, -2)$.

   Answer: First get the slope of the line: $m = \frac{-2-6}{7-(-4)} = \frac{-8}{7+4} = -\frac{8}{11}$

   then, use one of the points to write the equation (either one will do). I use the second:

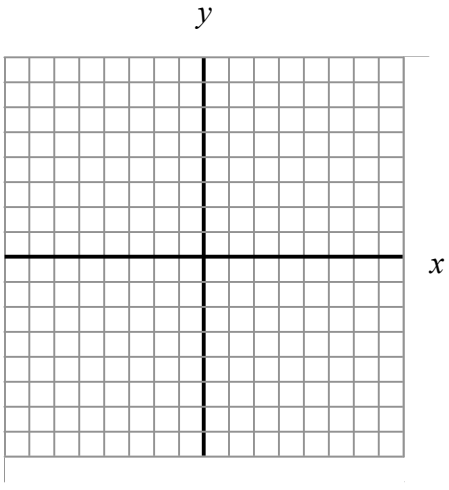
   $y - (-2) = -\frac{8}{11}(x - 7) \quad \rightarrow \quad y + 2 = -\frac{8}{11}(x - 7)$

3. How to **graph a line in Point-Slope form**:

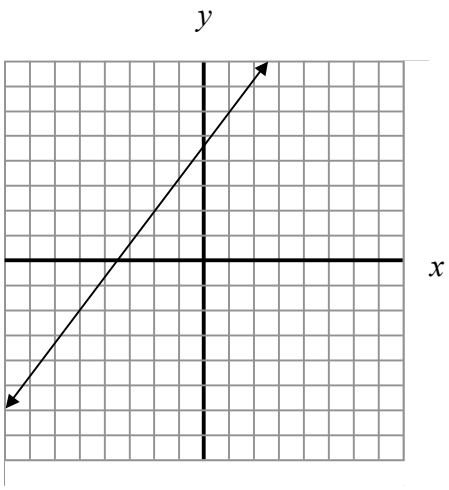
   Example: Graph the line $y - 4 = -\frac{2}{5}(x + 3)$

   Answer: The slope of the line is: $-\frac{2}{5}$ and the line contains the point $(-3, 4)$.

   Position the point and then use the slope to show another point and then draw the line.



4. Write an equation of a **line that is graphed using Point Slope form when the *y*-intercept is not known to be an integer**.



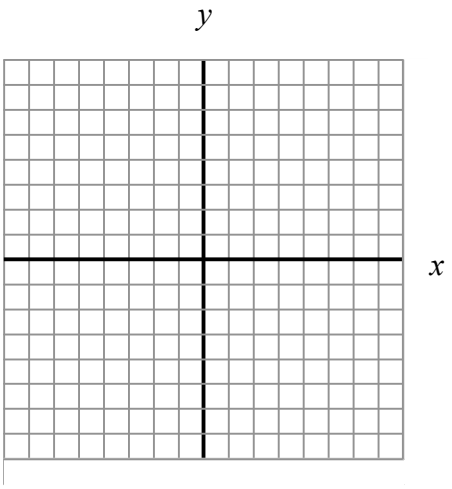
Example: See graph at right.

Answer: Identify the slope as $\frac{4}{3}$ and use one of the known points $(1, 6)$ to get $y - 6 = \frac{4}{3}(x - 1)$.

Practice

Write an equation for each line described below using Point-Slope form and **graph each line**.

1. The line with slope $-\frac{4}{5}$ that contains point $(3, -8)$.



2. The line that contains points (–3, 7) and (–5, –2).